Harnessing the power of Smart Store technologies

Reinvent the in-store experience, improve operations, and accelerate innovation in the cloud with Smart Store solutions on AWS

This ebook is for Retail decision makers who are interested in exploring the practical ways intelligent cloud-based technologies help transform customer experiences and automate in-store operations.

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Why physical stores remain the foundation of Retail

While online sales continue to grow, Forrester estimates that 72 percent of US Retail sales in 2024 will occur in a physical store.[6] Yet, today's customers want access to the same digital, self-service, and contactless tools that have emerged over the past few years. As stores become hubs of omnichannel commerce, retailers must adapt. Receiving, stocking, pricing, selling, fulfilling, and maintaining the store are areas where manual processes can be eliminated as new practices are introduced. However, successful retailers, not content to merely replace manual processes, are transforming the employee experience, which in turn creates a better customer experience.[7]

However, many retailers are stuck with legacy systems that prevent them from unlocking true omnichannel capabilities. That's why a growing number of retailers are modernizing their commerce software and architecture with a new generation of cloud technologies and tools from Amazon Web Services (AWS) and its partners. Continue reading to learn how these technologies are making retailers more agile— and more profitable.

INTRODUCTION

Welcome to Smart Store innovation

Physical stores remain a popular destination for shoppers to discover, research, see, touch, and buy Retail products. To meet new customer expectations, retailers are seeking smarter ways to bring the benefits of digital transformation into their brick-and-mortar locations.

During this era of constant change in Retail behaviors, key trends have emerged:

- Half of Retail customers intend to continue using the digital, mobile, self-service, and contactless technologies that have emerged since 2020.[1]
- 60 percent of customers will become repeat buyers after a personalized experience with a retailer.[2]
- By 2025, 60 percent of Retail customers expect Retail space to be focused on experience rather than product. This raises customer expectations for convenient, omnichannel digital experiences in physical stores.[3]
- By 2027, 70 percent of Retail store sales will be "digitally influenced."[4]

Physical stores are ripe for disruption given the low maturity of cloud-native and edge solutions. Forrester Research notes that "close to 64% of APAC retailers look to cloud as a key priority for the flexibility and agility it enables. However, retailers still fall short of accelerating cloud-first operations needed to succeed in the new Retail dynamic."[5]

[1] "The Retail Race: A Roadmap for Implementing a Smart Store Strategy," AWS for Industries Blog, May 2023

[2] "The State of Personalization 2021 Just Published," Twilio Sendgrid, June 2021

[3] "Retail trends 2023: Social commerce, personalization, omnichannel shine," The Future of Commerce, 2023

[4] "US Digital-Influenced Retail Sales Will Top $3.8 Trillion in 2027," Forrester, October 2022

[5] "Are Today's Retailers Ready For The New Normal?" Forrester, July 2020

[6] "Forrester: Physical stores to account for 72% of U.S. retail sales in 2024," Chain Store Age, October 2021

[7] "Making the Smart Store a Reality: How Retailers Can Elevate Experiences, Operate Efficiently, and Achieve IT Agility," AWS for Industries Blog, March 2021

How Smart Stores transform the Retail experience

To stay competitive, retailers must equip their stores with systems and tools that help them elevate the customer experience, operate more efficiently, and adapt with agility to changing market dynamics.[8] It's time to unlock digital innovation with Smart Stores. **Smart Store solutions on AWS** reinvent brick-and-mortar operations to enhance Retail engagement and operations in ways that are fast and frictionless, including:

- **Frictionless Checkout**, which allows customers to select items and leave the store without standing in a checkout line
- **Computer vision (CV) technology**, which reduces stockouts and tracks and analyzes shopper behavior to enhance sales
- **Integrated customer loyalty databases** and purchase history databases, which send personalized offers to customers while they are in stores
- **Holistic workforce management** solutions, which optimize staff productivity and engagement and enable a better consumer experience
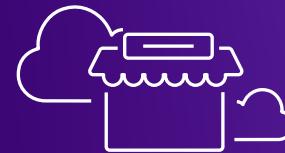
Smart Stores powered by cloud technologies

At the center of the rise in Smart Store innovation is the enabling power of cloud technologies. Among the leaders in this revolution is **AWS for Retail**, which has the broadest set of services, technology, and partners to support the retailer's journey. As the number-one innovator in the Retail industry, we are customer-obsessed and boast a 10-year head start in cloud services, leading this key technology sector.

Retailers have successfully leveraged AWS and Amazon technologies to help retailers deploy a wide range of digital capabilities and transform the traditional physical store approach. Read on and explore many of these capabilities and use cases, including digitally enabled practices that enhance day-to-day store operations, along with services and solutions that radically reimagine the traditional checkout experience.

aws FOR RETAIL AND CONSUMER GOODS

[8] "Making the Smart Store a Reality: How Retailers Can Elevate Experiences, Operate Efficiently, and Achieve IT Agility," AWS for Industries Blog, March 2021

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Accelerate Retail innovation with AWS Smart Stores

Change is a constant in Retail. It's led to the convergence of digital and physical worlds and the disruption of traditional brick-and-mortar stores—from the shopper's experience to the ways retailers design, equip, and manage their stores.

To compete more effectively, physical retailers are deploying new technologies that offer consumers a plethora of buying and delivery channels while adding unprecedented efficiencies and agility to in-store operations.

Smart Store capabilities on AWS empower retailers to reinvent the buying experience, providing fast, frictionless, and engaging shopping that delights customers while driving operational efficiency and IT agility. With AWS, retailers innovate faster, keep costs down, and scale effortlessly as their business grows.

Smart Stores in action

Digital in the store ›

- Unified/composable commerce
- Omnichannel experience
- Target marketing/personalization
- Assisted selling
- Curbside pickup
- Retail media networks/in-store advertising
- Voice interactive help
- Store analytics

In-store operations ›

- Edge computing
- In-store fulfillment
- Store inventory forecasting
- Electronic shelf labels
- Loss prevention/safety
- Workforce management
- Equipment management
- Equipment monitoring

Checkout experiences ›

- Frictionless checkout
- Smart shopping carts
- Biometrics/Amazon One
- Lockers
- Scan-and-go
- Radio-Frequency Identification (RFID) and Internet of Things (IoT) Checkout
- Alexa, Pay for Gas/Alexa, Find EV Charging Station

Digital in the store: Transforming customer experiences

Shoppers want more from their in-store experience. With AWS Smart Store capabilities, you can leverage technologies that transform both experiences and expectations. Simply put, Smart Store solutions on AWS allow retailers to provide fast, frictionless, and engaging shopping experiences that delight customers while driving operational agility.
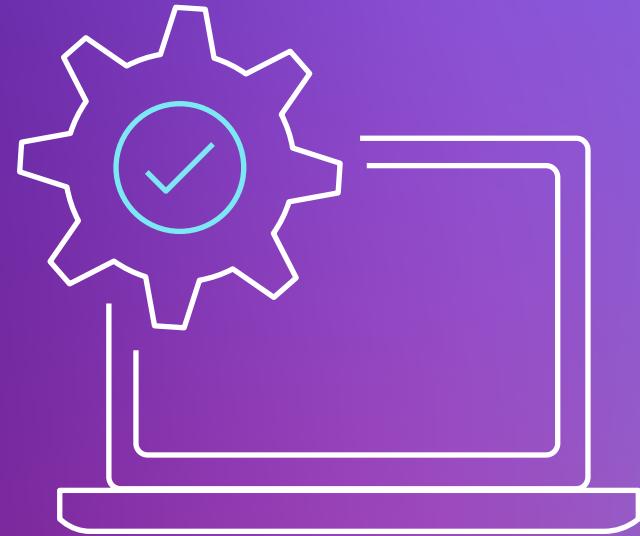
1. Unified commerce and composable commerce

Encompassing all customer-facing engagement, unified commerce delivers a connected experience regardless of the channel or touch point. It breaks down the silos of conventional multichannel environments and integrates marketing and operations activities—delighting your customers and helping to increase brand loyalty and advocacy. To further unify commerce operations, many retailers are adopting flexible, "composable" software applications that enable them to build digital solutions faster than ever. In that way, composable commerce has become the mechanism by which unified commerce capabilities are built and optimized. AWS is helping retailers modernize their systems by promoting a composable commerce architecture with our independent software vendor (ISV) partners.

2. Omnichannel experiences

Powered by the cloud, omnichannel strategies provide consumers with multiple ways to buy goods and services. For retailers, it opens up new pathways to sales, growth, and customer loyalty. The most innovative Retail solutions can provide omnichannel experiences on a single app.

As an example, a leading sportswear retailer developed a single application that adapts to who's using it and where. The app is truly omnichannel, providing personalized navigation based on preferences, offering special deals, and displaying in-stock items for the closest store. Shoppers can scan products to confirm size availability and check out through the app. They can "click and collect" to buy at home and then pick up merchandise from lockers at the store.

As a member of the MACH Alliance, AWS believes strongly in MACH-based principles to support convergence, composability, and flexibility. With 70 percent of MACH Alliance members on AWS, retailers have access to proven capabilities that can help them deploy new features 80 percent faster than competing retailers.

3. Personalized recommendations

Given that modern shoppers expect a high-degree of personalization and are known to be twice as likely to purchase recommended products in-store, finding solutions to scale personalized recommendations beyond statistically based approaches is key. AWS offers **Amazon Personalize**, a solution powered by machine learning (ML), to rapidly integrate personalized recommendations into websites, applications, email marketing systems, and more.

When Mecca, an Australian beauty and skincare retailer, deployed Amazon Personalize, it began to produce tailored **product recommendations within hours** and today generates over 10 million product recommendations per week across all marketing campaigns. This level of personalization can also be digitally delivered through kiosks, mobile apps, and wearable devices.

4. Assisted selling

Adding digital solutions in-store provides new opportunities to boost sales, including assisted selling, also known as "clienteling." The key is getting access to customer data, including their purchase history and product preferences, and using that data to personalize and monetize those interactions.

Numerous retailers are building and scaling in-store apps to do just that. Take **Neiman Marcus**, an upscale retailer with a reputation for personalized service. To keep sales surging, the company built a digital selling app using a cloud-native serverless architecture on AWS—all of which enabled the team to launch its Connect solution 90 percent faster than planned. It also led to dramatic productivity increases from associates, as the in-store sales teams can now engage with customers from anywhere.

5. Curbside pickup

Digital technologies underpin a popular mode of buying in which shoppers place their orders online—from a retailer with a physical presence nearby—which allows customers to pick up the items at their convenience. Upon customer arrival, the goods are delivered as in a drive-through restaurant, hence the name BOPAC (Buy Online Pick up at Curb).

US pet store chain **Petco** fulfills customer needs quickly and conveniently with the curbside service it deployed in just six weeks with the help of AWS Retail Competency Partner JBS Solutions. Petco's mobile application, built using **AWS Lambda** and **Amazon DynamoDB**, also provided multiple personalized services, operational efficiencies, and cost savings.

6. Retail media networks

In-store advertising is used by Consumer Goods companies to expose active shoppers to their products. Now, digital capabilities from **AWS for Retail** are allowing brands to target in-store shoppers while helping retailers profit by monetizing in-store ads on well-established Retail media networks.

A good example of in-store advertising is Amazon Fresh groceries, an online and physical grocer that leverages a **demand-side platform** (DSP) from AWS to allow brands to programmatically purchase ad space in Amazon Fresh stores. With AWS, brands get more control over where their ads are featured to reach new and existing audiences, on and off Amazon.

7. Interactive voice help

When Retail customers want fast answers to product questions, waiting for a store associate can be a hassle. Here again, digital can help with advanced **interactive voice response (IVR)** solutions that use the latest in artificial intelligence (AI) and ML technologies to hold intelligent "conversations" with consumers and provide them with the information they need, when they need it.

Amazon Fresh leverages Alexa voice capabilities in-store to provide its customers with answers to questions and recommendations for support. Easy to interact with, the IVR system also provides product recommendations and guides users to product locations from their mobile devices.

8. Store data analytics

When you add Smart Store intelligence to your Retail business, there are a host of useful insights you can deploy to run more efficiently, launch innovative new features and services more rapidly, and attract foot traffic more easily.

Automating in-store operations

Day in and day out, retailers tackle a slew of operational activities to keep their stores running at maximum efficiency and their customers coming back. From edge computing and in-store fulfillment options to loss prevention, workforce management solutions, and more, Smart Store technologies are empowering retailers to handle the most complex store operations with modern cloud solutions, IoT devices, and analytics.

1. Edge computing

To keep up with ever-increasing customer expectations, retailers must invest in their stores to deliver a better customer experience. With **Edge Computing Services on AWS**, retailers can create a Smart Store architecture that runs both cloud and edge workloads and supports advanced capabilities, like IoT and CV projects.

With these solutions and combining edge computing with your on-premises Retail facility, retailers can deliver unique in-store customer experiences and automate operational tasks for peak efficiency. Using architecture that runs both on the cloud and at the edge will support advanced services such as sophisticated Retail kiosks, which are common in many airports.

2. In-store fulfillment

Grocery stores are discovering a game-changing service for customers who like to order groceries online and get them delivered without delay. Using an integrated set of cloud-based ecommerce services on AWS, a large UK grocery chain launched such an offering. The chain partnered with AWS Partner Naveo Commerce to gather orders from customers online, utilized barcode-based picking to assemble them for delivery, and partnered with last-mile delivery partner Bringg to deliver the goods via optimized routes. That's one of the ways retailers are shifting their stores into high-efficiency fulfillment hubs.

3. Smart inventory management

To operate stores profitably, retailers need an accurate forecast of product demand to keep their inventories at ideal levels. That's where **Amazon SageMaker** comes in. SageMaker is a fully managed service that enables high-performance, low-cost ML for any use case. With SageMaker, you can build, train, and deploy ML models at scale using tools like notebooks, debuggers, profilers, pipelines, MLOps, and more—all in one integrated development environment (IDE).

Choosing the right mix of products is key for Consumer Goods companies, and many are taking advantage of new mobile-enabled technologies that can capture thousands of images of the store shelf and provide real-time analytics to understand inventories and shelf layouts. AWS works with Singapore-based Trax to provide scalable computing and analytics from data captured through mobile devices around the world.

4. Electronic shelf labeling

Advanced electronic shelf labels (ESL) are gaining traction in stores worldwide. AWS Retail Competency Partner Last Yard helps retailers enhance the customer experience with ESL, Digital Shelf Edge (DSE), mobile screens, and more. **Last Yard**'s digital automation platform, built and run on AWS, helps companies like Woolworths, Australia's largest retailer, better engage shoppers at the point of purchase.

5. Loss prevention

Retailers are learning to protect their margins with the help of loss prevention solutions powered by edge and IoT technologies. These edge-as-a-service (EaaS) solutions provide secure real-time data and monitoring services that can thwart potential theft and empower a range of other benefits, including cold-chain monitoring, inventory management, and employee safety.

Rigado IoT Edge-as-a-Service is one example of an AWS Retail Competency Partner solution that helps retailers create these IoT edge infrastructures quickly, accelerating the move to Smart Stores. Retailers can use the solution's RFID and IoT tracking technology to monitor site inventory and stock and manage site safety.

6. Workforce management

Many retailers are struggling with labor turnover, higher labor costs, and worker burnout.[12] To address this, they are investing in employee experience as a driver of growth and innovation, and many are automating repetitive tasks so staff can focus on customers.

Beekeeper Digital Workforce Platform is a new cloud-native, mobile-friendly service that gives employees one place to look for shift schedules, pay stubs, onboarding, training, tasks, safety checklists, announcements, and more. Companies using the platform are seeing increased employee engagement, reduced turnover, and improved operational productivity.

AWS Retail Competency Partner Verint helps retailers and banks orchestrate great Retail experiences and store operations with cloud-based solutions for appointment scheduling, event booking, and walk-in virtual queuing.
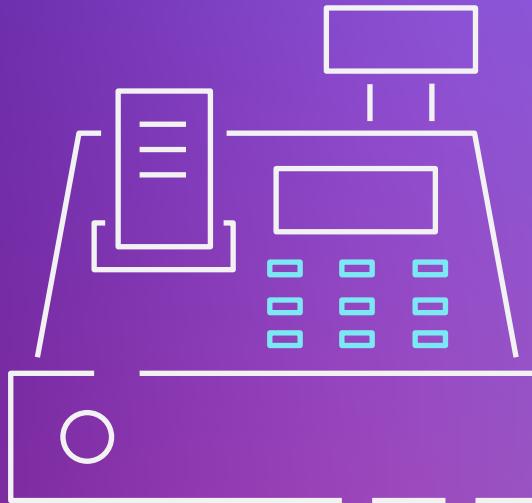
7. Energy management

With energy prices surging, Retail stores are looking for ways to reign in power consumption. Smart Store technologies are helping with real-time operational monitoring using non-intrusive load management (NILM) technology. A leading convenience store retailer is using AWS Partner Bosch's Phantom Solution powered by AWS to automate energy management of in-store refrigeration equipment. The solution, which can be easily replicated across most Retail operations, provides granular, load-side energy data, giving stores valuable insights to inform their energy savings and sustainability goals.

8. Equipment monitoring

Real-time operational monitoring helps retailers manage not just energy consumption but also the condition of in-store equipment. For example, a leading US food service chain with over 1,000 stores deployed IoT sensors to automate the servicing and management of more than 10,000 food preparation appliances. The boost in uptime drove annual service cost savings of $25,000 per store, revenue increases of 10 percent from faster recipe innovation, higher satisfaction ratings, and repeat business.

Simplifying checkout experiences

Over the past year, nearly nine out of 10 US consumers have abandoned physical store purchases because of long wait times.[9] That may explain why 85 percent of shoppers rated the checkout experience as "very important" or "important," yet only 23 percent are satisfied with it.[10] AWS for Retail offers a range of solutions to simplify these practices.

[9] McDonald, S., "Study: Retailers Are Losing $37.7 Billion Every Year, Thanks to Long Checkout Lines," Footwear News, April 2018
[10] Browne, M., "For customers, the waiting is the hardest part," Supermarket News, August 2018

1. Frictionless checkout

In response to the lines and waiting, retailers have launched frictionless new solutions, such as self-checkout, "scan-and-go," home delivery, and "click-and-collect." Today's consumers can now benefit from a more convenient shopping experience, and retailers can gain greater in-store productivity by reassigning staff to handle high-value interactions and tasks.[11]

When it comes to a hassle-free, in-store checkout experience, **Just Walk Out technology by Amazon** is setting the standard. This leading-edge Retail solution uses multiple technologies to determine "who took what" from the store. The concept is simple: When a shopper takes something off the shelf, it's added to their virtual cart. Then, when the shopper leaves the store, they are automatically charged for their purchases without waiting in line.

2. Contactless identity and payments

Retailers now have access to an innovative technology that lets their customers move through checkouts and entry gates faster than ever. It's called **Amazon One**, and it's a fast, convenient, contactless identity service powered by the palm of their hands. Customers simply hover their palm over the device to enter stores (and other venues), identify themselves, and pay for merchandise or services. For store operators, it's yet another way to boost customer satisfaction and loyalty.

85%

of shoppers rate the checkout experience as either "very important" or "important."[11]

McKinsey & Company

3. Self-service lockers

In an omnichannel world, customers love self-service options. **Amazon Hub Locker** meets that need with secure self-service delivery locations where customers can easily pick up and return their Amazon.com packages. Retail stores that host these self-service lockers also enjoy tangible benefits, including new revenue from the extra foot traffic and in-store advertising dollars.

4. Scan-and-Go

For many retailers, the smartphone is an integral part of the Smart Store. UK supermarket giant Sainsbury's is taking the lead in this capability, launching a mobile application that allows grocery customers to scan their items, pay, and skip the checkout line. The company's SmartShop app is expected to increase basket spend, relieve customers of long, frustrating checkouts, and offer a channel for cross-promoting in-store deals.

5. RFID and IoT checkout

Radio-Frequency Identification (RFID) is a tracking technology that uses tiny radio transponders to identify and track tags attached to objects, including consumer packaged goods in Retail stores. **TensorIoT**, an **AWS Retail Competency Partner**, leverages this technology and can help design and deploy frictionless checkout systems for a variety of Retail applications.

Many Retail operators are further disrupting the traditional checkout experience with **IoT technology**. An innovative store in Seoul teamed with AWS to launch a fully "man-less" shop called Uncommon Store, run by Hyundai. Its frictionless checkout system leverages **AWS IoT Core** to manage IoT device data at the store and **Amazon Kinesis Video Streams** to manage video streams. RFID technology can also facilitate Just Walk Out experiences for apparel retailers. While RFID technology has been around for decades and is typically used by stores to track and manage inventory, Amazon decided to figure out a way RFID could benefit customers in a **checkout-free environment**.

6. Alexa fuel and pay

Smart gas station operators have a powerful tool to attract customers and drive loyalty. It's a mobile app that lets customers safely activate a pump and pay for gas. They simply use the Alexa app on their phone (an Echo Auto or an Alexa-enabled device in their car) to find and activate the pump while the driver is still inside their vehicle. Payment is authorized by the customer and the receipt is immediately sent by email. The entire experience is swift and convenient.

For drivers of electric vehicles, Amazon offers a way to find nearby charging stations. Drivers simply ask their Alexa personal assistants to find a station to hear a list of locations with availability by plug type and the time and distance to arrival. The service is connected to over 150,000 public stations in the US.

Generative business intelligence (BI) capabilities in **Amazon Q**, the AI-powered assistant in **Amazon QuickSight**, can support retailers already capturing RFID or IoT data. Their users can build, discover, and share actionable insights and narratives in seconds using intuitive natural language experiences. They can also ask questions and create executive summaries using RFID-captured data and other BI data sources.

Accelerating innovation with AWS Retail Competency Partners

Composable applications are based on a MACH-oriented development framework that enables retailers to layer building-block microservices on top of a headless API architecture layer. The building blocks consist of a Smart Store portfolio, which contains use cases and critical integration points to guide retailers toward implementation.

AWS Retail Competency Partners can help accelerate the adoption of unified commerce and composable commerce practices, including:

- **Aptos** helps retailers integrate every part of their enterprise to enable seamless customer experiences no matter where, when, or how their customers shop.

- **NewStore** provides a mobile-first, modular cloud platform that combines point-of-sale (POS), order management system (OMS), clienteling, inventory, fulfillment, and mobile shopping apps.

- **Last Yard** helps retailers enhance the customer experience with technologies such as ESL, DSE, and mobile screens. Its digital automation platform, built and run on AWS, helps companies like Woolworths, Australia's largest retailer, to better engage shoppers at the point of purchase.

- **Firework** (in conjunction with Proto Hologram) helps retailers provide unique, immersive, and lifelike atmospheres for its Retail customers.

- **XY Retail** empowers retailers with a robust POS system and unified commerce solution to delight customers in the store and remotely across 27 countries. XY Retail's platform helps retailers handle complex omnichannel scenarios, drive in-store traffic with mobile clienteling capabilities, and fulfill online orders 300 percent faster.

AWS Retail Competency Partners provide innovative technology offerings that accelerate retailers' innovation journey across Customer Engagement; Supply Chain and Distribution; Physical, Digital, and Virtual Store; Advanced Retail Data Science; and Core Retail Business Applications.

Find AWS Retail Competency Partners ›

Born from Retail, built for retailers

AWS was born from running one of the largest, most successful retailers in the world. With our Smart Store offerings, we share that experience to help retailers:

- **Experiment and innovate faster** – The faster your business moves, the more ideas you can try out. Our large and growing set of AWS Smart Store capabilities helps you innovate and experiment quickly so you find winning ideas faster and drive the outcomes your business needs.

- **Scale quickly to meet demand** – Retailers deal with vast amounts of data across stores and systems. AWS can extrapolate that data into intelligent insights to inform decision making. When your innovations succeed—and demand surges—AWS helps you scale quickly.

- **Optimize technology investments** – When your IT applications work together as one, you multiply the power of your investments. AWS Smart Store offerings allow you to seamlessly combine data and resources from across your business, helping you streamline costs and accelerate innovation.

When you add intelligence to your stores, you will be better equipped to reap the benefits of happier customers and increased sales. Find out how AWS and our extensive industry partner network can support your Retail transformation.

Learn more about AWS for Retail ›

Browse curated solutions for Retail industry use cases in the AWS Solutions Library ›

Contact an AWS expert to get started today ›